We claim:

1. An acoustic transducer comprising:

a substrate having a topside and a backside;

a microfabricated acoustic transducer formed on the topside of the substrate; and

a damping material disposed on the backside of the substrate, the damping material suppressing substrate acoustic modes.

2. An apparatus according to claim 1 wherein the damping material has an acoustic impedance that is similar to the acoustic impedance of the substrate and is lossy.

3 An apparatus according to claim 1 further including electronic circuits formed in the substrate.

4. An apparatus according to claim 3 wherein the electronics circuits are in between the sensor and the damping material.

5. An apparatus according to claim 1 wherein the substrate is a wafer.

6. An apparatus according to claim 1 wherein the damping material suppresses a longitudinal ringing mode.

7. An apparatus according to claim 1 wherein the damping material suppresses a lamb wave ringing mode.

8. An apparatus according to claim 1 wherein the microfabricated acoustic transducer operates at frequencies above 20 kHz.

9. An acoustic transducer comprising:

a substrate having a topside and a backside, the substrate having a thickness such that resonant modes of the substrate are outside a frequency band of interest; and

a microfabricated acoustic transducer formed on the topside of the substrate.

10. An apparatus according to claim 9 further including:

a damping material disposed on the backside of the substrate, the damping material suppressing substrate acoustic modes.

11. An apparatus according to claim 10 wherein the damping material suppresses lamb wave modes.

12. An apparatus according to claim 10 wherein the damping material has an acoustic impedance that is similar to the acoustic impedance of the substrate and is lossy.

13. An apparatus according to claim 12 further including electronic circuits formed in the substrate.

14. An apparatus according to claim 13 wherein the electronics circuits are in between the sensor and the damping material.

15. An apparatus according to claim 9 further including electronic circuits formed in the substrate.

16. An apparatus according to claim 9 wherein the substrate is a wafer.

17. An apparatus according to claim 9 wherein the microfabricated acoustic transducer operates at frequencies above 20 kHz.

18. An apparatus according to claim 9 wherein the damping material suppresses stonely wave modes.

19. A method for suppressing acoustic modes, the method comprising:

providing a substrate having a topside and a backside;

forming a microfabricated acoustic transducer on the topside of the substrate; and

placing a damping material on the backside of the substrate, the damping material suppressing substrate acoustic modes.

20. The method of claim 19 wherein the damping material has an acoustic impedance that is similar to the acoustic impedance of the substrate and is lossy.

21. The method of claim 20 further comprising forming electronic circuits in the substrate.

22. The method of claim 21 wherein the electronics circuits are in between the sensor and the damping material.

23. The method of claim 19 wherein the substrate is a wafer.

24. The method of claim 19 wherein the damping material suppresses a longitudinal ringing mode.

25. The method of claim 19 wherein the damping material suppresses a lamb wave ringing mode.

26. The method of claim 19 further comprising operating the microfabricated acoustic transducer at frequencies above 20 kHz.

27. A method for suppressing acoustic modes, the method comprising:

providing a substrate having a topside and a backside, the substrate having a thickness such that resonant modes of the substrate are outside a frequency band of interest; and

forming a microfabricated acoustic transducer on the topside of the substrate.

28. An apparatus according to claim 27 further including:

a damping material disposed on the backside of the substrate, the damping material suppressing substrate acoustic modes.

29. The method of claim 28 wherein the damping material suppresses lamb wave modes.

30. The method of claim 28 wherein the damping material has an acoustic impedance that is similar to the acoustic impedance of the substrate and is lossy.

31. The method of claim 30 further comprising forming electronic circuits in the substrate.

32. The method of claim 31 wherein the electronics circuits are in between the sensor and the damping material.

33. The method of claim 27 further comprising forming electronic circuits in the substrate.

34. The method of claim 27 wherein the substrate is a wafer.

35. The method of claim 27 further comprising operating the microfabricated acoustic transducer at frequencies above 20 kHz.

36. The method of claim 27 wherein the damping material suppresses stonely wave modes.